

WHAT IS CLAIMED IS:

1. A semiconductor sensor comprising:
 - an intermediate plate having a first surface and a second surface;
 - a first electrode arranged on the first surface;
 - a second electrode arranged on the second surface;
 - a first plate having a cavity for forming a diaphragm and being bonded to the first surface, wherein the first plate, the intermediate plate, and the cavity define a hermetic chamber;
 - a third electrode arranged in the cavity facing towards the first electrode, wherein the third electrode and the first electrode are arranged in the hermetic chamber; and
 - a second plate bonded to the second surface and having a mass, the second plate including an elastic support for elastically supporting the mass and a fourth electrode arranged on the mass facing towards the second electrode.
2. The semiconductor sensor according to claim 1, wherein the intermediate plate is made of glass, and the first and second plates are made of silicon.
3. The semiconductor sensor according to claim 1, wherein the elastic support supports the mass movably in a direction perpendicular to the second surface when the semiconductor sensor is accelerated.
4. The semiconductor sensor according to claim 1, wherein the elastic support movably supports the mass parallel to the second surface when the semiconductor sensor is accelerated.

5. The semiconductor sensor according to claim 1, wherein the fourth electrode has a center offset from a center of the second electrode along the second surface, and the elastic support movably supports the mass along a line extending through the center of the second electrode and the center of the fourth electrode.

6. The semiconductor sensor according to claim 1, wherein the second plate has a cavity, and the mass is arranged in the cavity.

7. The semiconductor sensor according to claim 1, wherein the semiconductor sensor is arranged in a transmitter fixed to a tire of a vehicle in an apparatus for monitoring the condition of the tire.

8. A transmitter for use in an apparatus for monitoring a condition of a tire on a vehicle, the transmitter comprising:

a semiconductor sensor for detecting acceleration and air pressure of the tire, the semiconductor sensor including:

an intermediate plate having a first surface and a second surface;

a first electrode arranged on the first surface;

a second electrode arranged on the second surface;

a first plate having a cavity for forming a diaphragm and being bonded to the first surface, wherein the first plate, the intermediate plate, and the cavity define a hermetic chamber;

a third electrode arranged in the cavity and facing towards the first electrode, wherein the third electrode and the first electrode are arranged in the

hermetic chamber; and

a second plate bonded to the second surface and having a mass, the second plate including an elastic support for elastically supporting the mass and a fourth electrode arranged on the mass facing towards the second electrode; and

a controller connected to the semiconductor sensor to determine whether the vehicle is moving based on the detected acceleration, wherein the controller transmits information of the detected tire air pressure when the vehicle is moving.

9. The transmitter according to claim 8, wherein the intermediate plate is made of glass, and the first and second plates are made of silicon.

10. The transmitter according to claim 8, wherein the elastic support supports the mass movably in a direction perpendicular to the second surface when the semiconductor sensor is accelerated.

11. The transmitter according to claim 8, wherein the elastic support movably supports the mass parallel to the second surface when the semiconductor sensor is accelerated.

12. The transmitter according to claim 8, wherein the fourth electrode has a center offset from a center of the second electrode along the second surface, and the elastic support movably supports the mass along a line extending through the center of the second electrode and the center of the fourth electrode.

13. A semiconductor sensor comprising:

an intermediate plate having a first surface and a second surface;

a pressure sensing portion defined on the first surface, the pressure sensing portion including:

a first electrode arranged on the first surface;

a first plate bonded to the first surface, the first plate having a cavity for forming a diaphragm, wherein the first plate, the intermediate plate, and the cavity define a hermetic chamber; and

a third electrode arranged in the cavity facing towards the first electrode, wherein the third electrode and the first electrode are arranged in the hermetic chamber; and

an acceleration sensing portion defined on the second surface, the acceleration sensing portion including:

a second electrode arranged on the second surface;

a second plate bonded to the second surface and having a mass;

an elastic support for elastically connecting the second plate and the mass; and

a fourth electrode arranged on the mass facing towards the second electrode.

14. A transmitter for use in an apparatus for monitoring the condition of a tire of a vehicle, the transmitter comprising:

a semiconductor sensor including a pressure sensing portion for detecting air pressure of the tire and an acceleration sensing portion for detecting acceleration, the pressure sensing portion and the acceleration sensing portion being formed integrally with each other; and

a controller connected to the semiconductor sensor for determining whether or not the vehicle is moving from the

detected acceleration, wherein the controller transmits information of the detected tire air pressure when the vehicle is moving.

15. The transmitter according to claim 14, wherein the semiconductor sensor includes:

an intermediate plate having a first surface on which the pressure sensing portion is arranged and a second surface on which the acceleration sensing portion is arranged, the pressure sensing portion including:

a first electrode arranged on the first surface;

a first plate bonded to the first surface, the first plate having a cavity for forming a diaphragm, wherein the first plate, the intermediate plate, and the cavity define a hermetic chamber; and

a third electrode arranged on the diaphragm facing towards the first electrode, wherein the third electrode and the first electrode are arranged in the hermetic chamber; and

the acceleration sensing portion including:

a second electrode arranged on the second surface;

a second plate bonded to the second surface;

a mass movable relative to the second electrode when the semiconductor sensor is accelerated;

a plurality of elastic supports for elastically connecting the second plate and the mass; and

a fourth electrode arranged on the mass facing towards the second electrode.

16. The transmitter according to claim 15, wherein each of the elastic supports is curved.

17. The transmitter according to claim 16, wherein the

plurality of elastic supports extend radially from the mass.

18. The transmitter according to claim 15, wherein the pressure sensing portion and the acceleration sensing portion share the intermediate plate.